Spectrometer Regulation

Reliability addition

Tue, Nov 19, 2002

The regulation of the spectrometer magnet used before the beam dump at the end of the Linac is of some importance for reliable operations that does not needlessly irradiate accelerator components. The reading of the field produced by this magnet arrives via RS232 to the `node061F` front end every second. The `SPEC` local application examines this reading and adds it to its data pool. But—for whatever reason—what if there is no serial data arriving to be examined? How can operations learn about this situation? The LA right now does not care about the absence of serial data arriving to be examined; it merely examines whatever it sees actually arriving.

One possibility that can be added is a time-out period during which it must receive at least one valid-looking reading. If such a time-out is reached, how can this state of affairs be announced? One idea is to zero the spectrometer reading which will likely generate an alarm message. Another idea is to set a status bit that shows that the situation *vis-à-vis* serial communication is normal. This status bit can be included in a "combined binary status word" that can be monitored for alarms. Such a status bit can be cleared if the LA is disabled, or if the time-out that represents "failure to communicate" is reached. Another way to do this would be to measure the time since the last serial update was received. Then the alarm system could monitor that channel for not being too large; this would be a case for using integer min/max logic.

There is now a "locked" status bit that shows the program received a reading with the leading character 'L' included. Without that 'L', the program will not pay attention to the reading it received. If the Locked status bit is included in the alarm scan, it would show when the magnetic field monitor was out of lock, but it does not show it when no data is received.

At the time of this writing, the `L:SPEC` reading is not being monitored for alarms. The enable bit of the `SPEC` local application, is being monitored, however. The Locked status bit is not.

The present code also looks for the 'T' status indicator, which means that the hardware reads out in Tesla units. This is important, because the program does not look at the value without this indicator.

The program could be modified so that it generates a new "all-ok" status bit that can be monitored along with other more detailed status bits that delineate the cause. If the program is disabled, this bit would be cleared. One way to get the all-ok status would be for the program to monitor itself in terms of placing new values in the array of readings that are periodically averaged and compared against the nominal value reference. In addition, however, the reading of the `L:SPEC` should also be monitored for alarms.